

**MEMORANDUM OF AGREEMENT**  
**BETWEEN THE**  
**OFFICE OF SPACE FLIGHT OF THE**  
**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
**AND THE**  
**NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL**  
**SATELLITE SYSTEM INTEGRATED PROGRAM OFFICE**  
**FOR USE OF NASA'S SPACE NETWORK**

**1.0 PURPOSE:**

The purpose of this Memorandum of Agreement (MOA) between the Office of Space Flight of the National Aeronautics and Space Administration (NASA) and the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Integrated Program Office (IPO) is to establish a framework for the possible use of NASA's Space Network (SN) to support the command, control and communications requirements of the NPOESS. Specifically, this MOA establishes a technical and programmatic baseline for use of the SN in the NPOESS communications architecture, should either or both of the two contractor teams who will compete for development and production of the NPOESS decide to include the SN in their proposals to the NPOESS IPO. The programmatic baseline established by this MOA includes the NPOESS mission service level, the customer type, the fee structure, and the period of service, for utilization of the SN in NPOESS operations.

**2.0 BACKGROUND:**

**NPOESS**

The NPOESS constitutes a convergence of the Polar-orbiting Operational Environmental Satellite (POES) program of the National Oceanic and Atmospheric Administration in the Department of Commerce, the Defense Meteorological Satellite Program in the Department of Defense, and the remote sensing and spacecraft technology capabilities of NASA's Earth Science Enterprise. The NPOESS will provide atmospheric, land, and oceanic measurements for modeling weather and environmental conditions on a global scale for civilian and military purposes.

The NPOESS program is currently in the Program Definition and Risk Reduction (PDRR) Acquisition Phase, involving two competing contractor teams charged with defining the entire NPOESS architecture, including the command, control, and communications segment (C3S), which sets out how the environmental satellites will communicate with the ground. These two teams also plan to compete for the Engineering, Manufacture, and Development (EMD)/Production Phase contract, by submitting proposals to the NPOESS IPO in response to a Request for Proposal (RFP) scheduled to be issued in February 2002. The EMD/Production Phase contract is scheduled to be awarded to a single contractor team in August 2002, and will run through 2018. The EMD/Production contractor will be responsible for completing development of the NPOESS by producing, fielding, and supporting the entire NPOESS architecture. In their responses to the RFP, the contractor teams are free to propose any C3S architecture to meet the NPOESS system requirements. Depending upon the winning EMD/Production contractor's architecture, the SN may be used for the NPOESS.

The current plan, contained in the Government's reference architecture (subject to change based on the winning EMD/Production proposal), is that the NPOESS constellation will consist of three low-Earth orbiting satellites in sun-synchronous orbit. The satellites will collect Earth atmospheric and ocean information to be distributed to four user facilities: Suitland, Maryland; Monterey, California; Bay St. Louis, Mississippi; and Omaha, Nebraska. The threshold requirement is for globally collected NPOESS data to be delivered to the user facilities within 90 minutes from time of observation, with a goal of delivering the data in 15 minutes from time of observation.

## **NASA SN**

1. SN Space Segment. Since the 1980's, NASA has operated the Tracking and Data Relay Satellite System (TDRSS) to provide a communications link between Earth and Earth orbiting satellites. The TDRSS satellites are located in geosynchronous Earth orbit (GEO) and are positioned in orbital locations that are in constant view of either the White Sands Complex (WSC) at NASA's White Sands Test Facility in New Mexico, or of NASA's Guam Remote Ground Terminal (GRGT). The assigned orbital locations provide continuous or full period telemetry, tracking, and command coverage for near-Earth orbiting satellites.

The original TDRSS constellation concept was intended to provide three fully operational satellites, one in the East (or Atlantic region) at 041 degrees West longitude, one in the West (or Pacific region) at 171 degrees West longitude, and a fully functional spare at 079 degrees West longitude. Over the years the robust performance of the TDRSS spacecraft, as well as additional loading requirements, resulted in NASA's expansion of the system and the use of more spacecraft.

2. SN Ground Segment. The TDRSS spacecraft are controlled through the WSC and the GRGT. The WSC consists of two functionally equivalent ground terminals that provide network scheduling and command and control of the TDRSS satellites, as well as serving as the relay points for customer data to the necessary control and data collection centers. The GRGT is used to support the TDRSS satellite located at 085 degrees East longitude and the customer satellites serviced through that relay.

### **3.0 AUTHORITY:**

The NPOESS/IPO is authorized to enter into this MOA pursuant to 15 U.S.C. § 313.

NASA is authorized to enter into this MOA pursuant to Sections 203(c)(5) and (6) of the National Aeronautics and Space Act of 1958, 42 U.S.C. § 2473(c)(5) and (6).

### **4.0 REFERENCE DOCUMENTS:**

The following are reference documents describing the operational configuration and requirements of the NPOESS and the SN:

- Space Network Users Guide, Rev 7, Nov 1995.
- STDN [Space Tracking and Data Network] Test and Simulations Handbook, STDN No. 413.
- Space Network Synoptic Description, STDN No. 134.
- NPOESS Integrated Operational Requirements Document, 2001.
- NPOESS Technical Requirements Documents, Version 7, Jan 2002.
- NPP [NPOESS Preparatory Project] SN Project Service Level Agreement (PSLA), Draft, 14 Sep 2001.

### **5.0 JOINT RESPONSIBILITIES:**

The NASA Deputy Associate Administrator for Space Communications, and the NPOESS IPO System Program Director, shall annually assess the performance of NPOESS satellite communications support in terms of customer satisfaction, as defined in Paragraph 7.0k.

In addition, a joint coordination team shall be identified at the working level that will resolve issues, as needed, involving the execution of day-to-day satellite operational support. The team will include representatives from the NPOESS IPO Associate Director of Operations (IPO/ADO) and NASA's GSFC Mission Services Program, Customer Commitment Office. The coordination team will be empowered to address and resolve coordination issues as they may arise.

NASA and the NPOESS IPO will jointly develop an automated, generic scheduling capability that supports NPOESS standing support requirements as defined in Paragraph 7.0d.

## **6.0 NPOESS IPO RESPONSIBILITIES:**

If the NPOESS EMD/Production contractor requires SN for the C3S, the NPOESS IPO shall execute a Project Service Level Agreement (PSLA) no later than January 2003 requiring the NPOESS IPO to:

- a. Provide reimbursement to NASA for SN space communication services, through reimbursable agreements to be executed pursuant to 42 U.S.C. § 2473(c)(5) and (6), at the current internal NASA catalogue rate at the time of initial service, but not to exceed under any circumstances, through 2018:
  - \$50.00<sup>1</sup> per minute of connection time for SA K-band/ S-band service
  - \$4.50<sup>1</sup> per minute of connection time for MA S-band return service
  - \$18.00<sup>1</sup> per minute of connection time for MA S-band forward service
- b. Acquire, install, integrate, test, and maintain equipment at the WSC that will provide real time capture of the NPOESS data as it is delivered by the SN.
- c. Specify a NPOESS satellite orbital peak collection data rate not to exceed 20 Megabits per second, to be used by TDRSS generic scheduling functions.
- d. Provide satellite orbital ephemeris to NASA to support the scheduling process.

## **7.0 NASA RESPONSIBILITIES:**

NASA shall:

- a. Consider the IPO to be an internal NASA user for all SN usage fees.
- b. Agree to provide SN communication services at the rates listed in Paragraph 6.0a.
- c. Schedule all TDRSS contacts and provide the schedule to the NPOESS IPO.
- d. Provide a contact spacing interval of not more than 17 minutes at least 94% of the time on a monthly basis for each of three primary NPOESS operational satellites, beginning with the first NPOESS Satellite launch (planned for July 2008). Contact duration should be sufficient to recover all data recorded since the previous contact.
- e. If a scheduled contact interval exceeds the normal interval of 17 minutes or less, schedule additional time will be scheduled sufficient to recover all recorded data such that data latency is minimized within the contact scheduling process.

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<sup>1</sup> All Amounts are Then-Year Dollars.

- f. Support on a reduced priority basis up to three (3) residual NPOESS spacecraft, i.e., spacecraft with less than full operational capability.
- g. Provide floor space (not to exceed 1,000 sq. ft.), power, and environmental conditioning for ten (10) racks of data processing equipment, to be provided by the NPOESS IPO, at each WSC ground terminal location (called the White Sands Ground Terminal and the Second TDRSS Ground Terminal at the WSC) at no additional cost to the NPOESS IPO.
- h. Provide for the maintenance of the aforementioned space communication relay capability to provide continued space communication support for NASA and NPOESS IPO needs that may surpass the operational life of the TDRSS H, I, J series of satellites.
- i. Provide spacecraft communication system technical data and consultation concerning the acquisition and integration of TDRSS transponder equipment as requested by the NPOESS IPO.
- j. NPOESS operational satellites will be supported as the highest priority on-orbit, routine, user in the NASA mission set.
- k. Maintain a customer satisfaction level that meets a threshold of greater than 95% per month with a goal for each NPOESS satellite of greater than 99.5% per month. Customer satisfaction is defined as the TDRSS contacts scheduled under d. and e. above versus actual TDRSS contacts provided over a 30 day period.
- l. Provide the NPOESS IPO, or its contractor, access and use of a TDRSS Compatibility Test Van to support NPOESS factory compatibility tests and launch preparations.

## **8.0 AMENDMENT AND TERMINATION:**

This MOA may be amended by mutual agreement of the NPOESS IPO and NASA. Amendments must be in writing, and signed by the authorized representatives of both parties.

The term of this MOA shall be from the effective date until December 31, 2018, unless this MOA is terminated earlier. Either party may terminate this MOA subsequent to providing a minimum of 365-days advance notice to the other party.

## **9.0 ANTI-DEFICIENCY ACT:**

All activities under or pursuant to this MOA are subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341. This MOA is not a funding document, and does not represent the obligation or transfer of funds.

## 10.0 EFFECTIVE DATE:

This MOA is effective when signed and dated by both parties.

### FOR NASA:

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//SIGNED//

Robert E. Spearing  
Deputy Associate Administrator (Space Communications)  
Office of Space Flight

DATE: 24 January 2002

### FOR THE NPOESS IPO:

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//SIGNED//

John D. Cunningham  
System Program Director  
Integrated Program Office

DATE: 24 January 2002